



SEQUENCE LISTING

<110> PANACCIO, Michael
HASSE, Detlef

<120> THERAPEUTIC AND DIAGNOSTIC COMPOSITIONS

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<140> USSN 09/077574

<141> 1998-09-24

<150> AU PN 6910

<151> 1995-11-30

<150> AU PN 6911

<151> 1995-11-30

<150> PCT/AU/00767

<151> 1996-11-29

<160> 34

<170> PatentIn Ver. 2.0

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Ser Arg Gly Val Asp Lys Leu Ala Asn Ala Val Lys Val Thr Leu Gly	
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Pro Lys Gly Arg Asn Val Val Ile Glu Lys Ser Phe Gly Ser Pro Val	
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att aca aaa gat ggt gta tct gtt gca aaa gaa att gaa ctt gaa gat	192
Ile Thr Lys Asp Gly Val Ser Val Ala Lys Glu Ile Glu Leu Glu Asp	
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Lys Lys Val Thr Arg Ile Ala Leu Gln Asn Ala Ala Ser Val Ala Ser	
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1647

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 35 40 45
 Ile Thr Lys Asp Gly Val Ser Val Ala Lys Glu Ile Glu Leu Glu Asp
 50 55 60
 Lys Phe Glu Asn Met Gly Ala Gln Met Val Lys Glu Val Ala Pro Lys
 65 70 75 80
 Thr Ser Asp Ile Ala Gly Asp Gly Thr Thr Thr Ala Thr Val Leu Ala
 85 90 95
 Gln Ala Ile Tyr Arg Glu Gly Val Lys Leu Val Ala Ala Gly Arg Asn
 100 105 110
 Pro Met Ala Ile Lys Arg Gly Ile Asp Lys Ala Val Val Ala Val Thr
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 Lys Glu Leu Ser Asp Ile Thr Lys Pro Thr Arg Asp Gln Lys Glu Ile
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 Ala Gln Val Gly Thr Ile Ser Ala Asn Ser Asp Thr Thr Ile Gly Asn
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 Ile Ile Ala Glu Ala Met Ala Lys Val Gly Lys Gly Gly Val Ile Thr
 165 170 175
 Val Glu Glu Ala Lys Gly Leu Glu Thr Thr Leu Asp Val Val Glu Gly
 180 185 190
 Met Lys Phe Asp Arg Gly Tyr Leu Ser Pro Tyr Phe Val Thr Asn Pro
 195 200 205
 Glu Lys Met Val Cys Glu Leu Asp Asn Pro Tyr Ile Leu Cys Asn Glu
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 Ser Glu Glu Lys Thr Ala Gly Gly Leu Tyr Ile Pro Asp Thr Ala Lys
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 Glu Lys Pro Ser Arg Gly Glu Val Val Ala Val Gly Pro Gly Lys His
 35 40 45
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 50 55 60
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 Val Leu Phe Asn Lys Tyr Ala Gly Thr Glu Val Lys Leu Asp Gly Val
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 35 40 45

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 50 55 60
 Val Leu Phe Asn Lys Tyr Ala Gly Thr Glu Val Lys Leu Asp Gly Val
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Leu Ala Ile Gly Phe Thr Gly Ser Gln Gly Pro Asn Gln Ala Gly Met
35 40 45

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Glu Lys Thr Leu Asn Asp Leu Asp Ile Leu Leu Lys Asp Val Met Leu	
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Gly Ile Lys Ser Ala Pro Phe His Val Leu Ile Gly Pro Lys Ile Pro	
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gat gat att gaa gtt gta ggc gta aat aca ctt caa gat gca tca cca 1184
 Asp Asp Ile Glu Val Val Gly Val Asn Thr Leu Gln Asp Ala Ser Pro
 160 165 170

aat gag ata agt ttt cta gca aat gct aaa tat att cac cag ctt gtt 1232
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 175 180 185

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 190 195 200

gtt cca cga gca cta atc agt act gaa cca tat aga gat ttt ggt aga 1328
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gtt ctt tct tta ttc tct ata cct caa gga tgt ttt gat ggt ata agt 1376
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 220 225 230 235

cat caa gct tat ata cac cct aca gca caa gtc tct aaa aca gct act 1424
 His Gln Ala Tyr Ile His Pro Thr Ala Gln Val Ser Lys Thr Ala Thr
 240 245 250

atc tat cct ttn gtt ttt ata gga tc 1450
 Ile Tyr Pro Xaa Val Phe Ile Gly
 255

<210> 10

<211> 136

<212> PRT

<213> Lawsonia intracellularis

<400> 10

Ser Lys Glu Ser Thr Tyr Ile Ala Arg Ile Glu Asn Ser Thr Ser Glu
 1 5 10 15

Lys Thr Leu Asn Asp Leu Asp Ile Leu Leu Lys Asp Val Met Leu Thr
 20 25 30

Ser Lys Lys His Glu Ser Arg Arg Leu Ala Glu Ser Val His Gln Asn

35	40	45
Ile Leu Thr His Leu Ile Gln Lys Asn Tyr Asn Thr His Asn Gly Gly		
50	55	60
Ile Lys Ser Ala Pro Phe His Val Leu Ile Gly Pro Lys Ile Pro Ser		
65	70	75 80
Ile Leu Val Glu Val Gly Tyr Cys Ser Asn Lys Ala Glu Ala Gln Arg		
	85	90 95
Leu Ala Ser Ser Asn Tyr Gln Lys Ala Leu Ile Glu Gly Leu Ala Lys		
	100	105 110
Gly Ile Phe Cys Tyr Leu Lys Lys Leu His His Leu Asp Ile Tyr Ser		
	115	120 125
Ser Phe Xaa Leu Ser Asn Cys Thr		
	130	135

<210> 11
 <211> 123
 <212> PRT
 <213> Lawsonia intracellularis

<400> 11
Met Pro Gln Tyr Lys Leu Ser Glu Ile Ala Lys Leu Leu Asn Leu Thr
1 5 10 15
Leu Gln Gly Asp Asp Ile Glu Val Val Gly Val Asn Thr Leu Gln Asp
20 25 30
Ala Ser Pro Asn Glu Ile Ser Phe Leu Ala Asn Ala Lys Tyr Ile His
35 40 45
Gln Leu Val Leu Ser Gln Ala Gly Ala Ile Ile Leu Ser Lys Glu Tyr
50 55 60
Ala Ser Arg Val Pro Arg Ala Leu Ile Ser Thr Glu Pro Tyr Arg Asp
65 70 75 80
Phe Gly Arg Val Leu Ser Leu Phe Ser Ile Pro Gln Gly Cys Phe Asp
85 90 95
Gly Ile Ser His Gln Ala Tyr Ile His Pro Thr Ala Gln Val Ser Lys
100 105 110
Thr Ala Thr Ile Tyr Pro Xaa Val Phe Ile Gly
115 120

<210> 12
 <211> 559
 <212> DNA
 <213> Lawsonia intracellularis

<220>
 <221> CDS
 <222> (3)..(296)

<220>
 <221> CDS
 <222> (300)..(557)

<400> 12

ga tca aag ccg cat tta cng caa gag tta gaa att gaa gtt ttg aaa	47
Ser Lys Pro His Leu Xaa Gln Glu Leu Glu Ile Glu Val Leu Lys	
1 5 10 15	
aaa gaa gac ttt ggg cgt cat att gtt aaa tta tgc tgg aaa ggt tct	95
Lys Glu Asp Phe Gly Arg His Ile Val Lys Leu Cys Trp Lys Gly Ser	
20 25 30	
tta tca aat atc ttt ttt tcc tat ggg gat atc ccg cac cca cct tat	143
Leu Ser Asn Ile Phe Phe Ser Tyr Gly Asp Ile Pro His Pro Pro Tyr	
35 40 45	
ata cat caa agt aat aag gtt cag gat aag gaa aga tat cnt acn gta	191
Ile His Gln Ser Asn Lys Val Gln Asp Lys Glu Arg Tyr Xaa Xaa Val	
50 55 60	
tac tct ata tta cat aan ctg ggt tct gta gca gct cct aca gct gga	239
Tyr Ser Ile Leu His Xaa Leu Gly Ser Val Ala Ala Pro Thr Ala Gly	
65 70 75	
tta cnc ttt tct gaa act agc cgt nat aaa tta cac aaa nat ggt att	287
Leu Xaa Phe Ser Glu Thr Ser Arg Xaa Lys Leu His Lys Xaa Gly Ile	
80 85 90 95	
agt tgg gca taa atc cct ctt cac gtg gga tat gga aca ttc agt ccc	335
Ser Trp Ala Ile Pro Leu His Val Gly Tyr Gly Thr Phe Ser Pro	
100 105 110	
gtc ctc tgc aat gac atc cca aaa cat ctt atc cnt tct gag ttt gtt	383
Val Leu Cys Asn Asp Ile Pro Lys His Leu Ile Xaa Ser Glu Phe Val	
115 120 125	
cac ttt cct gaa act acn ttt tcc act ata tta aat gca cgg ttt gca	431
His Phe Pro Glu Thr Xaa Phe Ser Thr Ile Leu Asn Ala Arg Phe Ala	
130 135 140	
ngg gaa tac cta tgt tct gcc ata ggg gac cca ctg ttg tcc cca cca	479
Xaa Glu Tyr Leu Cys Ser Ala Ile Gly Asp Pro Leu Leu Ser Pro Pro	
145 150 155	
ttg gan ggg tgt tat ctt acc cct ttc gcc cgg ggt tcc cct ccc caa	527
Leu Xaa Gly Cys Tyr Leu Thr Pro Phe Ala Arg Gly Ser Pro Pro Gln	
160 165 170	
ccc tat tcc att gng ttt tcc tct caa att at	559
Pro Tyr Ser Ile Xaa Phe Ser Ser Gln Ile	
175 180	

<210> 13
 <211> 98
 <212> PRT
 <213> Lawsonia intracellularis

<400> 13
 Ser Lys Pro His Leu Xaa Gln Glu Leu Glu Ile Glu Val Leu Lys Lys
 1 5 10 15
 Glu Asp Phe Gly Arg His Ile Val Lys Leu Cys Trp Lys Gly Ser Leu
 20 25 30
 Ser Asn Ile Phe Phe Ser Tyr Gly Asp Ile Pro His Pro Pro Tyr Ile
 35 40 45
 His Gln Ser Asn Lys Val Gln Asp Lys Glu Arg Tyr Xaa Xaa Val Tyr
 50 55 60
 Ser Ile Leu His Xaa Leu Gly Ser Val Ala Ala Pro Thr Ala Gly Leu
 65 70 75 80
 Xaa Phe Ser Glu Thr Ser Arg Xaa Lys Leu His Lys Xaa Gly Ile Ser
 85 90 95
 Trp Ala

<210> 14
 <211> 86
 <212> PRT
 <213> Lawsonia intracellularis

<400> 14
 Ile Pro Leu His Val Gly Tyr Gly Thr Phe Ser Pro Val Leu Cys Asn
 1 5 10 15
 Asp Ile Pro Lys His Leu Ile Xaa Ser Glu Phe Val His Phe Pro Glu
 20 25 30
 Thr Xaa Phe Ser Thr Ile Leu Asn Ala Arg Phe Ala Xaa Glu Tyr Leu
 35 40 45
 ys Ser Ala Ile Gly Asp Pro Leu Leu Ser Pro Pro Leu Xaa Gly Cys
 50 55 60
 Tyr Leu Thr Pro Phe Ala Arg Gly Ser Pro Pro Gln Pro Tyr Ser Ile
 65 70 75 80
 Xaa Phe Ser Ser Gln Ile
 85

<210> 15
 <211> 477
 <212> DNA

<213> Lawsonia intracellularis

<220>

<221> CDS

<222> (2)..(10)

<220>

<221> CDS

<222> (14)..(178)

<220>

<221> CDS

<222> (182)..(220)

<220>

<221> CDS

<222> (224)..(256)

<220>

<221> CDS

<222> (269)..(295)

<400> 15

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t ata aaa cat tag cgn ctt tng tat ttg gac ttc aaa aaa att ttt aat 49
  Ile Lys His      Xaa Leu Xaa Tyr Leu Asp Phe Lys Lys Ile Phe Asn
    1              5              10              15
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```
tat ata gga gaa cat tca cca tta aaa cgt aat gta ant atg gaa gat 97
Tyr Ile Gly Glu His Ser Pro Leu Lys Arg Asn Val Xaa Met Glu Asp
      20              25              30
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```
gta ggt aaa tct gct gtt ttt tta gct tca gac ctn tca tca gga gta 145
Val Gly Lys Ser Ala Val Phe Leu Ala Ser Asp Xaa Ser Ser Gly Val
      35              40              45
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acc ggt gaa ttn ttt ttg ttg atg ctg gna caa taa ttt agg tat tta 193
Thr Gly Glu Xaa Phe Leu Leu Met Leu Xaa Gln      Phe Arg Tyr Leu
      50              55              60
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acc ata cat gct tta tac aac ata ttg tga gtt aca ata gcc ata aca 241
Thr Ile His Ala Leu Tyr Asn Ile Leu      Val Thr Ile Ala Ile Thr
      65              70              75
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cat tta tat tct ata taataacagt ag aat aat aat aga ata ttt ttt atg 292
His Leu Tyr Ser Ile      Asn Asn Asn Arg Ile Phe Phe Met
      80              85              90
```

```
acc atttgatatct atacaatagt aaatagatta atacatataa gactatatct 345
Thr
```

```
tttttgagag caacttaaag gagcgggttat ggcttttagtt acaaaagaag aagtacttca 405
```

```
ataccatagt gaaccccgac caggtaaact tgaagtatct tctataaaac catgtaaaac 465
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acaaaaagat cc 477
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<210> 16
 <211> 3
 <212> PRT
 <213> Lawsonia intracellularis

<400> 16
 Ile Lys His
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<210> 17
 <211> 55
 <212> PRT
 <213> Lawsonia intracellularis

<400> 17
 Xaa Leu Xaa Tyr Leu Asp Phe Lys Lys Ile Phe Asn Tyr Ile Gly Glu
 1 5 10 15
 His Ser Pro Leu Lys Arg Asn Val Xaa Met Glu Asp Val Gly Lys Ser
 20 25 30
 Ala Val Phe Leu Ala Ser Asp Xaa Ser Ser Gly Val Thr Gly Glu Xaa
 35 40 45
 Phe Leu Leu Met Leu Xaa Gln
 50 55

<210> 18
 <211> 13
 <212> PRT
 <213> Lawsonia intracellularis

<400> 18
 Phe Arg Tyr Leu Thr Ile His Ala Leu Tyr Asn Ile Leu
 1 5 10

<210> 19
 <211> 11
 <212> PRT
 <213> Lawsonia intracellularis

<400> 19
 Val Thr Ile Ala Ile Thr His Leu Tyr Ser Ile
 1 5 10

<210> 20
 <211> 9
 <212> PRT
 <213> Lawsonia intracellularis

<400> 20

Asn Asn Asn Arg Ile Phe Phe Met Thr
 1 5

<210> 21
 <211> 525
 <212> DNA
 <213> Lawsonia intracellularis

<220>
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 <222> (2)..(352)

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<220>
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 <222> (413)..(433)

<220>
 <221> CDS
 <222> (437)..(451)

<220>
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 <222> (455)..(523)

<400> 21
 g gaa ttg tta gta ttc tcc cag aac aga agc caa aat att tgg cta ctt 49
 Glu Leu Leu Val Phe Ser Gln Asn Arg Ser Gln Asn Ile Trp Leu Leu
 1 5 10 15

aca tta cct att ttt gtg tta ggt ata gca caa ggt ata tca ttt cct 97
 Thr Leu Pro Ile Phe Val Leu Gly Ile Ala Gln Gly Ile Ser Phe Pro
 20 25 30

tta gta aac agc cac att aca tca ctt gca cca aca tcc aac aga gct 145
 Leu Val Asn Ser His Ile Thr Ser Leu Ala Pro Thr Ser Asn Arg Ala
 35 40 45

att gtt atg gct ata aac agt aca ttt atg agg tta agt cag agt att 193
 Ile Val Met Ala Ile Asn Ser Thr Phe Met Arg Leu Ser Gln Ser Ile
 50 55 60

tcg caa atg gtt ttt ggt att gga tgg tca ttt ttt ggt tgg cct ggt 241
 Ser Gln Met Val Phe Gly Ile Gly Trp Ser Phe Phe Gly Trp Pro Gly
 65 70 75 80

cct ttt ata ttt ggt ctt ttt act tct att ata tta gcc ctc tta att 289
 Pro Phe Ile Phe Gly Leu Phe Thr Ser Ile Ile Leu Ala Leu Leu Ile
 85 90 95

atg aag tat ttt caa gat gta acc caa tat cac cta ttt ttg ata agt	337
Met Lys Tyr Phe Gln Asp Val Thr Gln Tyr His Leu Phe Leu Ile Ser	
100 105 110	
agt aaa ttt tat tat taa aaa gct tag tta gtt aag att aca tat att	385
Ser Lys Phe Tyr Tyr Lys Ala Leu Val Lys Ile Thr Tyr Ile	
115 120 125	
ata tac aat tac tat aac att aac taa tta cta act att act tcc aat	433
Ile Tyr Asn Tyr Tyr Asn Ile Asn Leu Leu Thr Ile Thr Ser Asn	
130 135 140	
tga tta att gat gct att taa aga gga tat att aat gat gtc atg gct	481
Leu Ile Asp Ala Ile Arg Gly Tyr Ile Asn Asp Val Met Ala	
145 150 155	
cac aat agg tgt tat cct tgg att agt gca tgg gat cca ggt cc	525
His Asn Arg Cys Tyr Pro Trp Ile Ser Ala Trp Asp Pro Gly	
160 165	

<210> 22
 <211> 117
 <212> PRT
 <213> *Lawsonia intracellularis*

<400> 22	
Glu Leu Leu Val Phe Ser Gln Asn Arg Ser Gln Asn Ile Trp Leu Leu	
1 5 10 15	
Thr Leu Pro Ile Phe Val Leu Gly Ile Ala Gln Gly Ile Ser Phe Pro	
20 25 30	
Leu Val Asn Ser His Ile Thr Ser Leu Ala Pro Thr Ser Asn Arg Ala	
35 40 45	
Ile Val Met Ala Ile Asn Ser Thr Phe Met Arg Leu Ser Gln Ser Ile	
50 55 60	
Ser Gln Met Val Phe Gly Ile Gly Trp Ser Phe Phe Gly Trp Pro Gly	
65 70 75 80	
Pro Phe Ile Phe Gly Leu Phe Thr Ser Ile Ile Leu Ala Leu Leu Ile	
85 90 95	
Met Lys Tyr Phe Gln Asp Val Thr Gln Tyr His Leu Phe Leu Ile Ser	
100 105 110	
Ser Lys Phe Tyr Tyr	
115	

<210> 23
 <211> 2
 <212> PRT

<213> Lawsonia intracellularis

<400> 23

Lys Ala

1

<210> 24

<211> 15

<212> PRT

<213> Lawsonia intracellularis

<400> 24

Leu Val Lys Ile Thr Tyr Ile Ile Tyr Asn Tyr Tyr Asn Ile Asn

1

5

10

15

210> 25

<211> 7

<212> PRT

<213> Lawsonia intracellularis

<400> 25

Leu Leu Thr Ile Thr Ser Asn

1

5

<210> 26

<211> 5

<212> PRT

<213> Lawsonia intracellularis

<400> 26

Leu Ile Asp Ala Ile

1

5

<210> 27

<211> 23

<212> PRT

<213> Lawsonia intracellularis

<400> 27

Arg Gly Tyr Ile Asn Asp Val Met Ala His Asn Arg Cys Tyr Pro Trp

1

5

10

15

Ile Ser Ala Trp Asp Pro Gly

20

<210> 28

<211> 846

<212> DNA

<213> Lawsonia intracellularis

<400> 28

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acnccatttg tganccatga acatcatcan natatcctct ttanatagca tcnannnntc 120
 aannggaatt aacagttact anntagttaa tgtcatagta attgtcnata atatatgtaa 180
 tcttaactaa ctaagctnnt taataataaa attnactact tatcaanaat aggtgatatn 240
 gggttacatc ttgaaaatac ttnccataat tangagggt aatataatng aantaaaaag 300
 accanatata aaaggaccag gccaaccaaa aatgaccat ccaataccna aaacaattgg 360
 cgaaaatact ctgacttaac ctcanaaatg tactgtttat agccatatca atagctctgt 420
 tggatgtngg ngcaattgat gtaatgtggc tgtntactan angaaatgat ntacctcgtg 480
 ctatnccan nacaanaata ngtaatgtaa gtanccnaat atcttggtt tgtaatggga 540
 gaataatnnc aagtccttgg gaaatnaant tacnccagc cagctatnnt aagcagttct 600
 ntgggtgacta tacgtcctac tnaantcgtg ccaaagatta aatanncgat aatcgcnctn 660
 cctaaancan gcaatactaa aatggtttct ncctancttg gnatanggtg gaagcncgga 720
 cagaattnan ttgcgnantt tanannggaa natnccgtnaa nttantcggg gccannccn 780
 aaattcctna ntcnatanan naactnnctn cntataaang gccnactgga ntngttaaat 840
 gaaata 846

<210> 29

<211> 855

<212> DNA

<213> *Lawsonia intracellularis*

<400> 29

gattntttat cgatcactnt agacgcgatt tgggnaacac ttacctggta nccacccggg 60
 tggaaaaatc gatgggcccg cggccgctct agaagtactc tcgagaagct ttttgaattc 120
 tttggatcct caacacaggg tatggattaa aacaacttta gctctaacag gagcatttta 180
 taatatattc cctggtagaa caatatctac tcaagaaaat ctgtctattg gttttcaact 240
 aaaaaaaact tttaaacctt ttcatcggac catcttactc ttagatgaac attatatgtc 300
 ttgcgaaga attgcagcag caattatgcc tgcacagctt gctggagtta aaaacattat 360
 agctgttttg accagtaaaa ataaccgact gaccgctgaa aaaatctcac ctgctttact 420
 aacaacatta gaactttcag gagttaacat agccctaaca cttaccaca ctgaaactga 480
 acttcttatt catcaattaa tgaaaatagg tattggaaac ctgttatatt ttttaaaaga 540
 agaagacata ctacatatat ctactatacc tgtactacct ttctggaaag aatatacttc 600
 tcatcgactt gttatagaaa aagatgctgg cnttaataca gaaatcctcc aatgggcnc 660

tcttcattca attattgaac aaatagcaac agaaccatac tctgaaanac atcccagatg 720
 cactttactg tgctagctca tccantaaaa actatnctca tanagnatcc ccagaatttt 780
 tcatnatgga cttgaacctt tttggattca ncccaacnct tctccaanc ctcctttctc 840
 catacaccat gggga 855

<210> 30
 <211> 1082
 <212> DNA
 <213> *Lawsonia intracellularis*

<400> 30
 tatctngttg antcaataaa acttttgggg cccntnaaan tttcatnann aaaaaaacia 60
 nattnctggg ggncccntcc caaaaaannc aatcantnng aancctgnct tcttattnng 120
 nttttanac tataatatnt nttatcnata atnnatcnnt atactnattt ctnattcant 180
 nacannngnn agnaanntta atctnaaana ctncnaaggg ggnnnnata ntntttnttt 240
 nttntcccn ttnaatnnat aacennncac cennattant ttnaatnnat accatancnn 300
 cctttcaaac tgtacacata ntannnaann aactcnanc ntttncatc ctctctantn 360
 ccnactcna tnnantntt ccccatncc tatntntcnc tgcttccag nttnnacntn 420
 ncttntttc acantattcc tatccaant aacatntntn ntntcntnct ccttntntnt 480
 tatntntttc tntacctnn cactgacant ctatnantna nntcnatac tnttatanct 540
 ntangcnant ntatctanaa ntntancnnn nnatcntnac ngccgtnnat ntntnnncan 600
 ttanntann ctancntnnc caannncnta tntatnaata acnactatcc natattnnat 660
 tnnntntnt cttanncaaa tnatrtangc ncacnncact angtnatatn annattntat 720
 attntgaanc ttctnggctt cncnaatant accantnnnc anctcnnt ncatctnnnt 780
 ntacttnta ccatancgct ctnagnntc actacttcta ntagtnatcn tctactgcn 840
 atggcnnnnn gcnnnnncgan agntatncac ntacantnnc ntctactatn tanatctann 900
 nontccgng cctncgtac gnnnngcna antcgnntac tttncntnta tctagtncn 960
 tcagnnnng antcctcaan cngctctan ttacatgtnn nntnatgcnc tanancgna 1020
 cntctatcct tcnantctgc nctnantnta tanactctnn nnnatcnncn aanciatntc 1080
 cc 1082

<210> 31
 <211> 354

<212> DNA

<213> *Lawsonia intracellularis*

<400> 31

ctcccntnnc nctaagtgga ntcgcgcgct gcaggctcgac actagtggat cttgatatac 60
ttttaaaaga tgtgatgtta acatcaaaaa agcatgaatc acgttagact tgcagagtct 120
gtacatcaaa atattcttta cccaccttaa tacgaaaana aatnnttatn cncncnatg 180
gggtgggntn aaatcctngc cccnttnccc tgttcnttta gggaaccccc naattcccn 240
ngttattcct ctgtttgaaa nttctggtn cccggccctn tnaccaanag cttgannncc 300
nccccgtcct ggggcatacct cntgtttatt ttccctcnan ccccccttn actn 354

<210> 32

<211> 477

<212> DNA

<213> *Lawsonia intracellularis*

<400> 32

ggatcttttt gtgttttaca tggttttata ggaaataactt caagtttacc tggtcgggggt 60
tcactatggg attgaagtac ttcttctttt gtnactaaag ccataaccgc tcctttaagt 120
tgttctcaaa aagaatatag tcttatatgt attaacttat ttactattgt atagatacaa 180
taggtcataa aaaatattct attattattc tactgttatt atatagaata taaatgtgtt 240
atggctattg taactacaaa tatgttgtat aaagcatgta tggttaaata cctaaattat 300
tgtncagca tcaacaaaaa naattcacgc gttactcctg atganaggtc tgaagctaaa 360
aaaacagcag atttacctac atcttcata nttacattac gttttaatgg tgaatgttct 420
cctatataat taaaaatttt ttggaagtcc aaatacnaaa gncgctaattg ttttata 477

<210> 33

<211> 568

<212> DNA

<213> *Lawsonia intracellularis*

<400> 33

gatcatttaa aaaaccatct tgagtaaaac gaaaattccc tgctcgtgta tagtgtactt 60
tattctctaa tgtaacctga aaaaaacctt ttocaccaat agcaagatct gttacactat 120
tgccagggttc aaaagcaccg tgtgtaaaaa ttgtgcgaac acttccaacc tgtgctccca 180
taccagcctg gtttggtccc tgacttcag taaaacctat tgctaaatct tgactaaaca 240
ggctcttgaac cactacctgt tgctgcttat acccaatggg atttgcgtta gcaatattat 300
tgagagacagt accanccctg tnotatgggt tttcatacct gttggcanca ataaacaaac 360

tccccatcat gataacatct cctaaaaaat aatttcatgg nggnaaaaat gttacctaca 420
catctctatt ttnaaagcaa aaaacccatg cccaanaaaa tttttgggcc naattaatat 480
acttaatcta ataaactttt ttgggtaatn aaaaaaaatt aattttttta acttggtttt 540
accaaccttt tctccttact ttttaacc 568

<210> 34
<211> 477
<212> DNA
<213> *Lawsonia intracellularis*

<400> 34
ggtacccac cggggtggaa aatcgatggg ccgcggccg ctctaaaant actctcgaga 60
agctttttga attcttttga tccccaggaa taacttggtg acggaatttt acattttcta 120
tccctgcaaa tanaaaaact ttaccttgta gttcattaat aggaaaagat tggagtactg 180
tgattccacc tgattgcgcc atagcttcta aaattagaac tccaggcatg acaggaaatc 240
caggggaaat gaccngaaa aaatggttca ttaatactaa cttttttata agctttaata 300
tatttgccag cattaaattc aataactcta tctacaatta aaaaggata acggtgggga 360
atttactgta aaatttcttg gatatttttg aggtatggat ggggacatta attttcctat 420
atatatgctc tttttctttt onaaaatttt tcagcttttt tatcccntaa aaacctc 477